SUBSISTENCE HARVEST OF PACIFIC SALMON IN THE YUKON RIVER DRAINAGE, ALASKA, 1987

by

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ABSTRACT

Comprehensive surveys to census subsistence salmon catches within the Alaska portion of the Yukon River drainage have been conducted annually by the Alaska Department of Fish and Game since 1961. In 1987 full funding was available to survey the subsistence catch in 40 villages. The estimated Alaska subsistence harvest and approximate 95% confidence intervals were 53,124 ± 2,960 chinook salmon (*Oncorhynchus tshawaytscha*), 275,914 ± 16,721 summer chum salmon (*O. Keta*), 245,834 ± 18,630 fall chum salmon and 48,603 ± 14,690 coho salmon (*O. kisutch*). The 95% confidence intervals presented here are statistical measures that are based on proportion of known fishermen interviewed, and do not address illegal or unknown fishing activity, or the error in recall ability. Approximately 1,200 fishing families participated in the subsistence fishery. The chinook and fall chum salmon harvests in 1987 were the largest since 1961 and 1977, respectively. Summer chum and coho salmon harvests were the second largest since 1977. An increase in reported subsistence harvests of chinook, summer chum, and coho salmon is apparent.

KEY WORDS: Chinook salmon, chum salmon, coho salmon, subsistence fishing, personal-use fisheries, Yukon River.

INTRODUCTION

Pacific salmon (*Oncorhynchus*) are utilized by commercial, sport, and subsistence fishermen throughout the Yukon River drainage. In the Alaska portion of the Yukon River drainage salmon are harvested and utilized for personal consumption and dog food by people in more than 40 communities. Because subsistence use of fishery resources preceded other uses and has cultural significance, it is the intent of the Alaska Legislature that subsistence fisheries be given the highest priority so long as maintenance of fish stocks on a sustained-yield basis is not jeopardized (ADF&G 1987). The implementation of the State of Alaska's subsistence use priority and control of total exploitation for stock conservation requires collecting subsistence fishery data on species composition, harvest and effort levels, geographic fishing patterns, and methods of harvest in addition to similar data for the commercial and sport fisheries.

The major salmon stocks of the Yukon River drainage are fully utilized. Any decline in stock abundance or proposals for increased harvests by one group requires a reallocation by the Alaska Board of Fisheries which has regulatory authority.

Similarly, the new State of Alaska subsistence law made effective 1 June 1986 requires the Alaska Board of Fisheries to determine those salmon stocks traditionally used for subsistence purposes by rural residents and will require the most precise harvest information which can be provided (Andrews 1986). It is therefore important to estimate past and future subsistence harvests on an annual basis and understand the precision and accuracy of the estimates.

In addition, subsistence harvest information is necessary in treaty negotiations between the United States and Canada involving the allocation of Yukon River salmon. Accordingly, funding for this project in 1987 was from the United States Department of Commerce, National Oceanic and Atmospheric Administration.

Subsistence salmon harvest and fishing effort data have been collected by the Alaska Department of Fish and Game (ADF&G) since 1961. Unfortunately the methodology for expansion of survey results for many years was never published and will be difficult to retrieve due to changing personnel. Recently Brannian and Gnath (1987) reported subsistence data and survey methodology for 1986 and provided a historical review for the Alaska portion of the Yukon River drainage. Annual surveys to estimate subsistence catch and effort have also been conducted by the Canadian Department of Fisheries and Oceans in the Canadian portion of the Yukon River drainage since 1962. Subsistence data have been collected using a combination of multiple in-season and postseason personal interviews and returned catch cards (Seigel and McKenzie 1985).

This report presents an estimate of the subsistence salmon harvest and effort in the Alaska portion of the Yukon River drainage by species,

village, and district for 1987, along with measures of accuracy and precision. Historic subsistence catch and effort data are presented. Additionally, a survey of the subsistence harvest of northern pike (*Esox lucius*) was conducted in the Minto Flats area.

Description of The Survey Area

The Yukon River (Figure 1) is the largest river in Alaska and is the fifth largest drainage in North America, draining approximately 35% of the state's land mass. The river originates in British Columbia, Canada within 48 km of the Gulf of Alaska, and flows over 3,700 km to its mouth on the Bering Sea draining an area of approximately 855,000 km^2. The study area addressed in this report is limited to that portion of the Yukon River drainage within Alaska.

The Alaska portion of the Yukon River drainage has been divided into six commercial fishing districts, five along the main stem Yukon River from the mouth to the U.S.-Canada border and the sixth in the main stem Tanana River. Districts 1-3 are referred to as the Lower Yukon area and Districts 4-6 as the Upper Yukon area.

The survey area includes more than 30 communities along the main stem Yukon River and more than 15 communities on significant tributaries of the Yukon River such as the Innoko, Koyukuk, Tanana, Chandalar, and Black Rivers. In addition, the coastal villages of Scammon Bay and Hooper Bay located south of the Yukon River mouth were surveyed in 1987. There are approximately 10- to 15-thousand Eskimo and Athabascan Indian people living in the area, the majority residing in the 45 surveyed communities (ADF&G 1986). The region's population experiences a moderate increase during the fishing season as a result of visiting commercial fishermen, relatives, and friends. Only villages within the Yukon River drainage and the coastal villages near the mouth will be discussed in this report. Yukon River salmon also comprise some unknown proportion of mixed stock subsistence catches farther north and south of the Yukon River delta.

Minto Flats is an extensive wet-land area with its eastern margin located approximately 30 miles west of Fairbanks. The area drains into the Tanana River by the Tolovana River and is characterized by numerous lakes and ponds, often interconnected by slow flowing streams and sloughs. The streams in this area are generally not suitable salmon habitat and the only recognized salmon producing stream is the upper, clear-water portion of the Chatanika River (F.M. Andersen, ADF&G, Fairbanks, personal communication).

Description of the Subsistence Fishery

All five species of Pacific salmon, chinook (*O. tshawytscha*), chum (*O. keta*; a summer and fall run), coho (*O. kisutch*), and to a much lesser extent, pink (*O. gorbuscha*) and sockeye salmon (*O. nerka*) are harvested

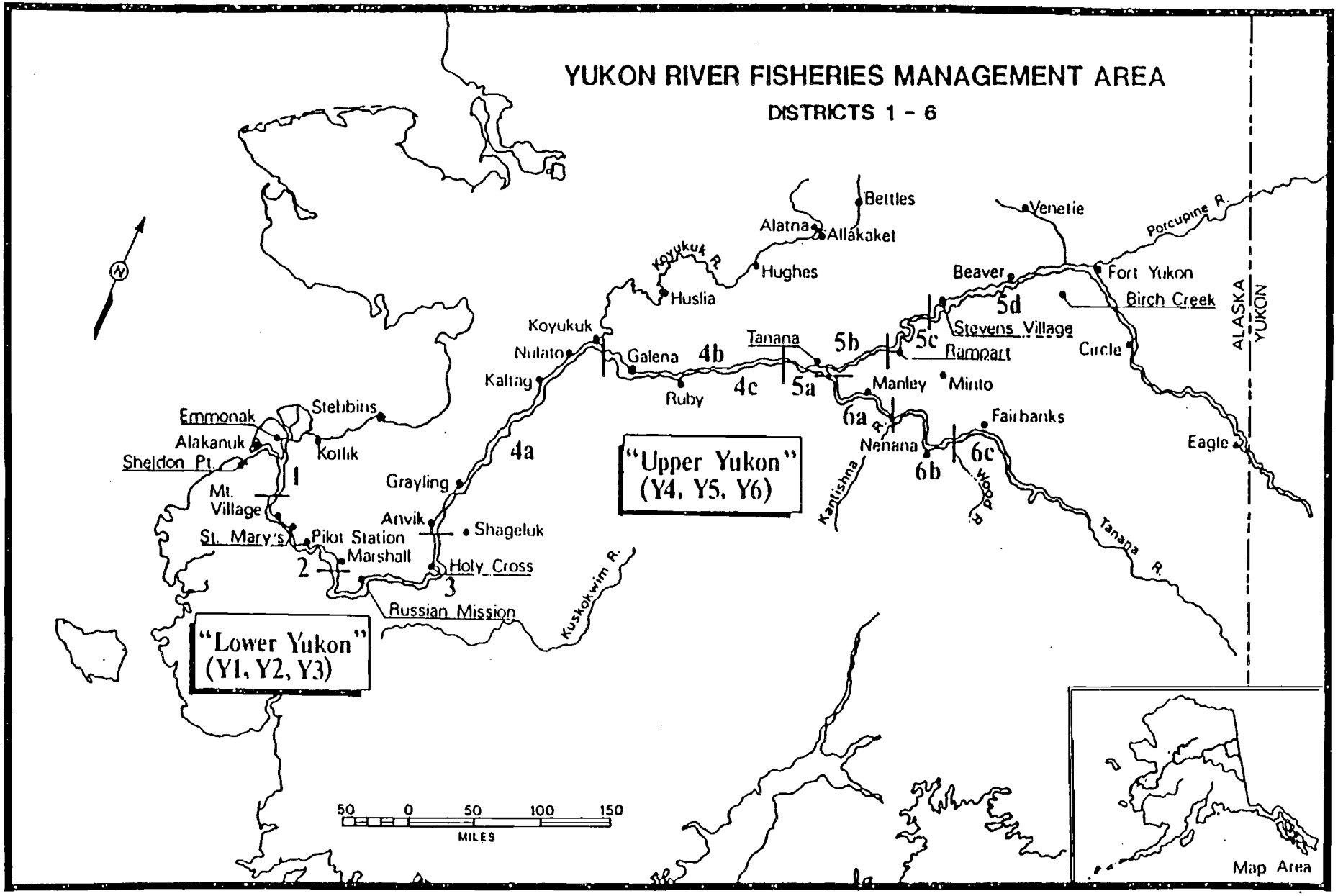

Figure 1. Villages and fishing district boundaries for the Alaska portion of the Yukon River drainage.

from late May through October for subsistence purposes. In addition, several species of whitefish (Coregonus), inconnu (*Stenodus leucichthys*), northern pike, Arctic grayling (*Thymallus arcticus*), burbot (*Lota lota*), two char species (*Salvelinus*), Alaska blackfish (*Dallia pectoralis*), saffron cod (*Eleginus gracilis*), Arctic lamprey (*Lampetra japonica*), and other fishes are also harvested for subsistence purposes and contribute significantly to the diets of the fishing communities (Wolfe 1982). Discussion of these non-salmon species is limited because harvest data obtained in 1987 is restricted to salmon, whitefish, and iconnu taken during the summer months and northern pike taken in the Minto Flats area. Salmon remain the largest portion of the total subsistence harvest for most subsistence households (Wolfe 1982).

Subsistence fishing in the survey area is often not an individual effort but the activity of extended family groups. The group, or "fishing family" is commonly related by ties of kinship; it cooperates during the summer in the harvesting, cutting, drying, smoking, and storing of salmon. The fishing family often includes a commercial fisheries limited entry permit holder who fishes for both commercial and subsistence purposes. Because commercial fishermen may retain any portion of their harvest for subsistence use, clear distinction between commercial and subsistence user groups is often difficult. It is also difficult to discriminate between subsistence and commercial catches in some instances. In District 4 the majority of commercial sales are made up of chum salmon roe. The carcasses of female chums and the majority of males are then used for subsistence purposes.

In the spring of 1986 the Alaska Legislature redefined subsistence fishing in Alaska as rural activities. The Alaska Boards of Fisheries and Game are required to define communities and areas of the state as being either rural or nonrural. In the spring of 1987 a number of communities in the Yukon and Tanana River drainages were designated nonrural, and residents of those areas are no longer eligible to participate in subsistence fishing for fall chum salmon. Determinations regarding other fish species will be made in the future. The Board of Fisheries established a new "personal-use" category for nonrural residents (including Fairbanks, Delta, Healy, Clear and other areas) to continue to harvest salmon for their own use.

In general, personal-use salmon fisheries will be managed by regulations currently established for subsistence fishing. Major differences include: subsistence fisheries have priority over personal-use fisheries, salmon taken for personal-use may not be used for dog food, and permits issued by the department are required for all personal-use fishermen.

In the Yukon River drainage subsistence fishing time is unrestricted up to 24 h before the first scheduled commercial fishing period and 24 h following the last scheduled period of the season. During the commercial fishing season subsistence fishing is allowed only during commercial fishing periods. In the Lower Yukon area, beginning in 1983, additional time for subsistence fishing was allowed during specially scheduled fishing periods every other weekend during the chinook and summer chum season and every weekend during the fall chum season in order to offset reductions in

commercial fishing time. If the commercial fishery closes in the Upper Yukon area for longer than 5 days within the season, subsistence fishing is allowed daily except for a 48-hour weekly closure which is scheduled for varying time periods in Districts 4-6. Fishing time available historically for subsistence fishing is described by Brannian and Gnath (1987).

In Districts 1-3 set and drift gill nets, beach seines and fish wheels may be operated, except that in District 1, after July 19, a special set net only coastal area has been established which is closed to the use of other gear types. Currently set gill nets are heavily utilized by fishermen from the coastal villages of Kotlik and Sheldon's Point, while drift gill nets are the dominant gear type used by fishermen from villages in District 2. In District 4-6 only set gill nets and fish wheels may be operated. However, beginning in 1983 fishing with drift gill nets was allowed in District 4 over a 183 km stretch of river from Stink Creek, 48 km south from Kaltag, upriver to Cone Point, midway between Koyukuk and Galena (Huntington 1981, Marcotte 1982).

Fish wheels are generally more efficient than nets for some species and areas, yielding higher catch per unit effort (CPUE) in the Upper Yukon River. In District 5 fish wheels account for a higher chinook CPUE than set gill nets. In District 6 fish wheels are a more efficient gear type for harvesting chum and coho salmon.

Recently, concern has been expressed about declines in northern pike populations in the Minto Flats area. For this reason information relating to subsistence harvest and effort for this species as well as salmon is important in this area. Most subsistence salmon fishing occurs in the Tanana River near "Old Minto," while lesser catches of salmon are reported from the Tolovana River. Pike fishing occurs throughout the flats, but in winter months is centered on an overwintering concentration in the Chatanika River/Goldstream Creek area. Subsistence northern pike fishermen in this area have been directly competing with Fairbanks sport fishermen accessing the area from the recently constructed Murphy Dome Road. Sport fishing in this area has been closed by emergency order until sufficient biological data are available to adequately assess the impact of the increased harvest.

METHODS

Data Collection

Estimation of the 1987 subsistence harvest in the Alaska portion of the Yukon River drainage involved a combined program of permit monitoring, catch calendars, postseason fishing interviews and postal surveys. These methods were similar to those used since 1983, except for the utilization of catch calendars.

Subsistence or personal-use permits (depending on the fishermen's residence) are required in three areas within the Upper Yukon area: (1) the

Yukon River between Hess Creek (river km 1,266) and Dall River (river km 1,346); (2) the Yukon River between the upstream mouth of Twenty-two Mile Slough (river km 1,650) and the US-Canada international border and (3) the Tanana River drainage upstream of the Wood River confluence (river km 1,430). Tanana River catches are reported daily via telephone to the Fairbanks office. Yukon River permits are returned at the conclusion of the fishing season with a table of daily catches.

A list was compiled by village of all known heads of families who subsistence fish, prior to the 1987 fishing season. This was accomplished by updating the list of fishing families contacted in previous years by Subsistence and Commercial Fisheries Divisions. Such lists have been maintained in computer files since 1980 and were updated annually based on the contacts made during the latest survey or as information concerning deaths or family transfers became known. Village lists were then verified by community officials or knowledgeable individuals for each area, where possible, in order to make any final additions or deletions. The list then consisted of a contact person and address for each household known to subsistence fish for salmon though it may not be known whether or not they actually fished in 1987.

The list of fishing families for areas where permits were issued was simply a list of those people who received permits in 1987. Lists for the Lower Yukon (Districts 1-3) and Upper Yukon areas (Districts 4-5) were maintained in separate Lotus 1-2-3 worksheets in the respective area offices of Anchorage and Fairbanks.

Subsistence catch calendars were issued to fishing families appearing on the subsistence fishing list during May 1987, prior to the salmon migrations. This was the first year since 1983 that catch calendars were utilized. Fishermen were encouraged to use these calendars to record their daily subsistence catches. Calendars were returned to the Department postseason by mail or collected by Department personnel during postseason surveys.

Postseason fishermen interviews were conducted with fishermen throughout the Yukon River drainage using the subsistence fishing list as a base. Surveys were timed to provide the best possible information by taking into account the availability of fishermen, fishing activity level, availability of personnel and equipment to conduct surveys, and comparability of annual survey results. Fishermen not contacted by personal interview and who had not returned a catch calendar were mailed a subsistence fishing questionnaire.

Personal interviews were conducted systematically throughout the drainage on a village by village basis. Upon arrival in a village the city office or village police were contacted and the purpose and the methods of the survey were explained. An attempt was then made to contact and categorize each person on the computer listing as to the following codes:

1. fished as determined from an interview
2. fished as determined from others though not interviewed

3. did not fish as determined from an interview
4. did not fish as determined from others though not interviewed
5. cannot determine whether they fished or not
6. name should be removed from the list (e.g. if the family has moved).

Names were also added to the list at this time if the contact for the household changed or if additional families were found to have fished in 1987. Families that received fish from other families, but did not actually fish were not included as being a fishing family.

During the personal interview catch was recorded for each salmon species, including separate records for summer and fall run chum salmon, and for whitefish and inconnu. The amount of gear owned and operated at least once during the season were recorded as numbers of large or small mesh gill nets or number of fish wheels. Number of dogs per household were also recorded because a significant proportion of the chum salmon harvest is used for dog food. Similar information was requested on the postal surveys and permits. Additionally, in the Lower Yukon Area, fishing method (set, drift or both) and whether the fishing family had a member that commercially fished were recorded during the interviews.

Thirty-eight villages with historically documented subsistence catches were surveyed postseason. Communities which no longer exist or where fishermen are now permanent residents of other communities were dropped or merged with a nearby village. Those obtaining permits were reported by community of residency and grouped by the district in which fishing occurred although the village may not physically reside in that district. As an example, harvest data from permitees of the Yukon River between Hess Creek and the Dall river were reported using the local name Fairbanks Fish Camp (F.C.) referring to the general borough of residency for those fishermen. The harvest taken by Tok residents holding permits for the Yukon River upstream of Twenty-Two Mile Slough was reported in District 5. Permit data from residents of Fairbanks, North Pole, and Salcha fishing in the Tanana River upstream of Wood River were pooled. Further, data from Fairbanks permits issued during the chinook and summer chum salmon runs (Fairbanks - summer) and permits issued during the fall chum and coho salmon runs (Fairbanks-fall) were entered separately by seasonality of harvest to allow accurate estimates of unreported catches.

The department monitors the salmon runs in the lower Yukon River by conducting two test fishing projects. Substantial numbers of fish are given away to local families in the villages of Emmonak and Kotlik. Fish given away for subsistence purposes in 1987 were tallied by species and by village and added to the reported subsistence harvest for those two villages. Households which received fish only from ADF&G were considered to be fishing families because it was assumed that they would have fished if they had not been given fish.

Estimation of Subsistence Harvest and Effort

It was necessary to estimate the number of fishing families in 1987 for

villages in which fishing status could not be determined for all names on the master list. The number of fishing families (F_k) for village k was estimated as follows:

$$F_k = \Sigma_{i=1}^{2} f_{ik} + f_{5kP_k}$$

where:

f_{1k} = number of families that fished and were surveyed for catch and effort data

f_{2k} = number of families that fished but were not directly surveyed

f_{3k} = number of families that indicated they did not fish during the survey

f_{4k} = number of families that did not fish but were not directly surveyed

f_{5k} = number of families for which it is not known whether they fished or not

P_k = the proportion that fished of the total for which fishing status is known

$$\text{and } P_k = (f_{1k} + f_{2k}) / \Sigma_{i=1}^{4} f_{ik}$$

Only data collected during personal interviews and returned permits were used to estimate the proportion p_k because it was hypothesized that very few people who did not fish would return postal surveys. The number of fishing families in each village was the sum of the number of known fishermen whether or not catch and effort data were collected (f_{1k},f_{2k}), plus an estimate of the number of fishing families among those (f_{5k}) for which the fishing status was unknown. The best available estimate of the proportion of unknowns to have fished was, p_k, the proportion of those that fished of all families for which fishing status was determined during the postseason village survey and returned permit data.

The variance for the number of fishing families was estimated by:

$$\text{Var}(F_k) = f_{5k}^2 \text{ Var}(P_k)$$

where the variance of p_k (Snedecor and Cochran 1980) was estimated by:

$$\text{Var}(Pk) = (f_{5k} / \Sigma_{i=1}^{5} f_{ik}) \; Pk \; (1-p_k) \; / \; (\Sigma_{i=1}^{4} f_{ik} - 1)$$

The average village catch ($\bar{C}_k$) was estimated by fish species, summer and fall run of chum salmon and whitefish genus from the catch per household (C_{ik}) data collected through personal interviews, returned postal surveys and permits. Mean village catch per fishing family $\bar{C}_k$) was estimated by:

$$\bar{C}_k = \sum_{i=1}^{f_{1k}} C_{ik} \; / \; f_{1k}$$

and its variance includes a finite population correction factor (fpc_k) of all known families that were determined to have fished in 1987:

$$\text{Var}\ (\bar{C}_k) = (fpc_k) \sum_{i=1}^{f_{1k}} (C_{ik} - \bar{C}_k)^2 \; / \; (f_{1k} - 1)\ f_{1k}$$

where:

$$fpc_k = (f_{2k} + f_{5k}) \; / \; (f_{1k} + f_{2k} + f_{5k})$$

The estimated harvest for each village (C_k) became the product of the mean catch per family and the number of fishing families:

$$C_k = F_k\ \bar{C}_k$$

and its variance was estimated as:

$$\text{Var}(C_k) = F_k^2\ \text{Var}(\bar{C}_k) + \bar{C}_k^2\ \text{Var}(F_k) - \text{Var}(\bar{C}_k)\text{Var}(F_k)$$

Village catch and effort estimates and their variances were summed across villages for district subtotals and across districts for drainage wide totals. Village catches were considered strata and the drainage wide variance was then the sum of the variance of village catches. Catch and effort estimates for the villages of Hooper Bay and Scammon Bay were not included as part of the Yukon River drainage harvest because these villages have not been surveyed since 1977. In addition an unknown proportion of fish harvested in these villages are destined for river systems other than the Yukon River.

The sample mean is the most common summary statistic, though if the underlying distribution is not symmetric it may not be the preferred statistic to describe central tendency. The mean can be sensitive to a few extremely large or small values and in that case the median may be the better statistic to describe a "typical" fishing family or at least to state the level of catch for which half the village caught greater and half caught fewer. Therefore, both the sample mean and median were calculated for each village.

RESULTS AND DISCUSSION

A total of 807 fishing families was interviewed, and 171 postal surveys and 359 permits were returned (Table 1). Overall 83% of those known to subsistence fish were surveyed for catch and effort data. This is a 5% increase in fishermen contacted over the 1986 survey, thus contributing to the improved precision of the 1987 subsistence harvest estimate.

The mean catch per fishing family varied by village and run of salmon (Table 2). The mean catch of chinook salmon per fishing family along the main stem increased from 15 chinook salmon in Alakanuk to 237 chinook in Rampart. The mean summer chum catch per fishing family was largest in District 4 with an average catch of 1,805 fish in Anvik. The mean fall chum catch per fishing family was largest in District 5 with 1,101 fish in Tanana. The mean coho catch per fishing family was largest in District 6 with 481 fish in Nenana. In general the mean catch of summer chum was smaller than the mean fall chum catch in Districts 5 and 6 and larger in Districts 1 through 4. The mean catch per family was slightly larger for fall chum than coho salmon in villages of Districts 1 through 3. Standard deviations were generally quite large and increased directly with mean catch.

The distribution of catch per fishing family by area (Lower and Upper Yukon) is presented for chinook, summer chum, fall chum and coho salmon in Figures 2-5. Village median catch (Table 3) was consistently smaller than its mean catch and the magnitude of the difference depended on the degree to which the catch distribution was skewed. Note that the number of small and zero catches resulted in a median coho catch of zero for most Yukon villages. The number of fishing families that reported subsistence catches of chinook and summer chum salmon in Districts 1-3 was larger than the number reporting catches of fall chum and coho salmon (Table 4). In the Upper Yukon area the number of families reporting catches of fall chum was similar to that reporting chinook catches.

Commercial fisheries data have shown that a small percentage of fishermen take a relatively large proportion of the total catch. This trend was also seen in subsistence catches in 1987. It was found that of those fishing families reporting catches greater than zero, 10% caught 36%, 31%, 40%, and 53% of the total reported catch of chinook, summer chum, fall chum and coho salmon, respectively, in the Lower Yukon area. In the Upper Yukon area 10% of the fishing families caught 49%, 59%, 53% and 73% of the total reported catches of chinook, summer chum, fall chum and coho salmon, respectively.

The subsistence fishery is regulated in-season by district in conjunction with commercial fisheries management. The subsistence survey was designed to stratify by village for data collection and further summarize and analyze harvest data on a district level. Chinook, summer chum, and coho salmon catches were found to be significantly different among villages in all districts in 1986 (Brannian and Gnath 1987). The fall chum salmon catch per fishing family in 1986 was not significantly different within

Table 1. Number of households interviewed, received postal surveys or permits for the collection of postseason subsistence harvest data in the Yukon River drainage, Alaska, 1987.

District/ Area	Village	Date	Families on Computer List	Percent Contacted a	Number Contacted by: Personal b Interview	Postal Survey: Sent c	Postal Survey: Returned	Permits: Issued	Permits: Returned	Number of Unknown Fishing Status d
1	Sheldon's Pt.	8/25	19	74	13	5	1	0	0	2
	Alakanuk	8/24	85	56	35	50	13	0	0	32
	Emmonak	8/22-26	69	74	45	22	6	0	0	14
	Kotlik	8/21	58	100	58	0	0	0	0	0
2	Mt. Village	8/31	95	69	57	37	9	0	0	22
	Pitka's Pt.	9/01	13	69	7	5	2	0	0	2
	St. Marys	9/02	66	71	35	31	12	0	0	13
	Pilot Station	9/04	52	83	39	11	4	0	0	5
	Marshall	9/03	64	62	38	25	5	0	0	16
3	Russian Missionn	8/29	28	79	22	6	0	0	0	6
	Holy Cross	9/02	36	83	29	7	1	0	0	6
4	Anvik	9/09	19	95	15	3	3	0	0	0
	Shageluk	9/10	18	100	17	1	1	0	0	0
	Grayling	9/09	30	87	25	4	1	0	0	0
	Kaltag	10/26	25	96	23	2	1	0	0	0
	Nulato	10/27	36	83	19	17	11	0	0	3
	Koyukuk	10/29	18	89	14	4	2	0	0	0
	Galena	10/29	39	90	20	19	15	0	0	2
	Ruby	10/30	29	93	23	5	4	0	0	0
Koyukuk R.	Huslia	10/28	25	92	21	4	2	0	0	0
	Hughes	10/28	15	100	13	2	2	0	0	0
	Allakaket	10/28	25	96	18	7	6	0	0	0
5	Tanana	11/09	48	96	37	10	9	0	0	0
	Rampart	11/04	13	92	10	3	2	1	1	1
	Fbks F.C.	Permit	49	96	0	0	0	49	47	2
	Stevens Village	11/04	30	87	16	14	10	8	7	0
	Beaver	11/04	10	100	9	1	1	0	0	0
	Fort Yukon	10/21-23	46	85	34	12	5	0	0	4
	Circle	11/04	19	89	13	5	4	9	7	0
	Central	Mail	3	100	0	3	3	2	2	0
	Eagle e	11/10-11	70	89	50	19	12	42	18	2
Chandalar R.	Venetie	10/22	15	53	7	2	1	0	0	0
Black R.	Chalkyitsik	10/22	13	85	10	2	1	0	0	0
6	Manley	11/06	15	87	9	6	4	0	0	0
	Minto	11/05	32	81	26	1	0	0	0	1
	Nenana	Mail	46	40	0	46	18	0	0	15
	Fbks-Summer	Permit	213	97	0	0	0	213	206	5
	Fbks-Fall	Permit	76	93	0	0	0	76	71	5
Totals			1,562	83	807	391	171	400	359	158

a Some fishing families were interviewed and subsequently returned permits.
b Includes families which returned catch calendars by mail.
c Postal surveys were not sent to families on the computer list that were determined not to have fished from interviews with relatives or neighbors.
d Does not include those who were not contacted but for which fishing status was determined from interviews with relatives or neighbors.
e Data from Eagle includes four fishing families from Tok.

Table 2. Number of families fishing, their mean subsistence catch, and standard deviation by village in the Yukon River drainage, Alaska, 1987.

District/ Area	Village	Number Sampled for Harvest Data a	Catch in Number of Salmon b							
			Chinook		Summer Chum		Fall Chum		Coho	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Sheldon's Pt.	14	66	81	138	131	49	71	17	25
	Alakanuk	45	15	21	125	134	47	80	14	28
	Emmonak	46	25	39	153	165	106	274	45	139
	Kotlik	55	33	38	116	95	73	91	24	82
2	Mt. Village	63	25	29	139	107	55	96	28	56
	Pitka's Pt.	7	41	39	127	133	122	170	29	52
	St. Marys	40	36	33	194	194	49	108	25	60
	Pilot Station	39	57	59	94	109	13	25	7	12
	Marshall	37	47	39	73	90	73	95	43	96
3	Russian Mission	19	84	112	94	129	52	117	17	32
	Holy Cross	29	75	63	54	75	46	67	7	19
4	Anvik	16	27	26	1,805	2,537	25	32	25	77
	Shageluk	17	3	5	471	0	26	0	4	8
	Grayling	21	55	83	886	1,744	198	203	25	51
	Kaltag	17	62	55	1,586	2,007	415	699	0	0
	Nulato	23	56	90	581	1,092	78	95	3	11
	Koyukuk	12	44	85	694	1,418	178	238	64	146
	Galena	30	38	49	351	633	313	709	40	97
	Ruby	16	55	62	517	604	647	1,003	0	0
Koyukuk R.	Huslia	16	10	13	613	727	33	51	7	17
	Hughes	13	14	14	336	379	45	80	0	0
	Allakaket	19	15	23	435	571	74	135	1	3
5	Tanana	37	106	155	286	509	1,101	1,258	176	453
	Rampart	11	237	172	205	400	428	790	7	23
	Fbks F.C.	37	59	100	149	435	545	1,483	2	8
	Stevens Village	16	104	93	72	128	377	608	0	0
	Beaver	8	58	65	82	92	719	999	0	0
	Fort Yukon	24	134	163	40	113	516	648	1	6
	Circle	12	111	163	153	426	578	929	0	0
	Central	3	55	64	29	51	58	68	0	0
	Eagle	38	46	53	9	31	446	586	0	0
Chandalar R.	Venetie	7	2	4	0	0	347	118	2	6
Black R.	Chalkyitsik	7	0	0	0	0	336	528	0	1
6	Manley	6	5	12	33	52	533	662	183	256
	Minto	21	17	31	64	128	250	441	31	56
	Nenana	14	77	134	521	676	661	911	481	832
	Fbks-Summer	118	4	5	22	26	10	20	8	18
	Fbks-Fall	56	0	0	0	0	34	27	25	20

a Represents only those who reported catches. Data from personal interviews, catch calendars, postal surveys and returned permits pooled.
b Mean catch is reported to the nearest whole fish.

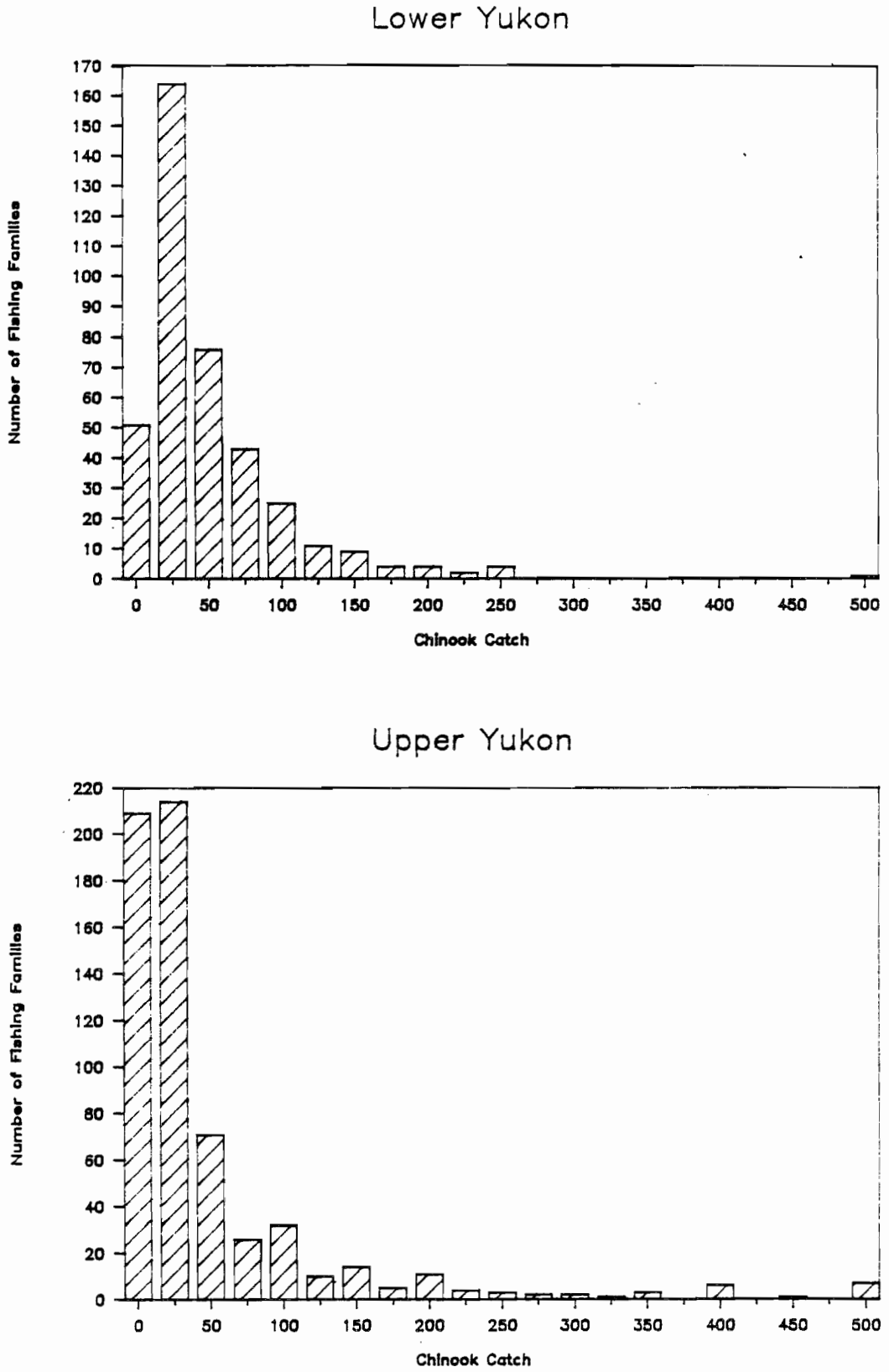

Figure 2. Histogram of 1987 chinook salmon catches in number of fish per fishing family in the Lower and Upper Yukon areas of the Yukon River, Alaska. The last bar on each graph also includes catches greater than 500.

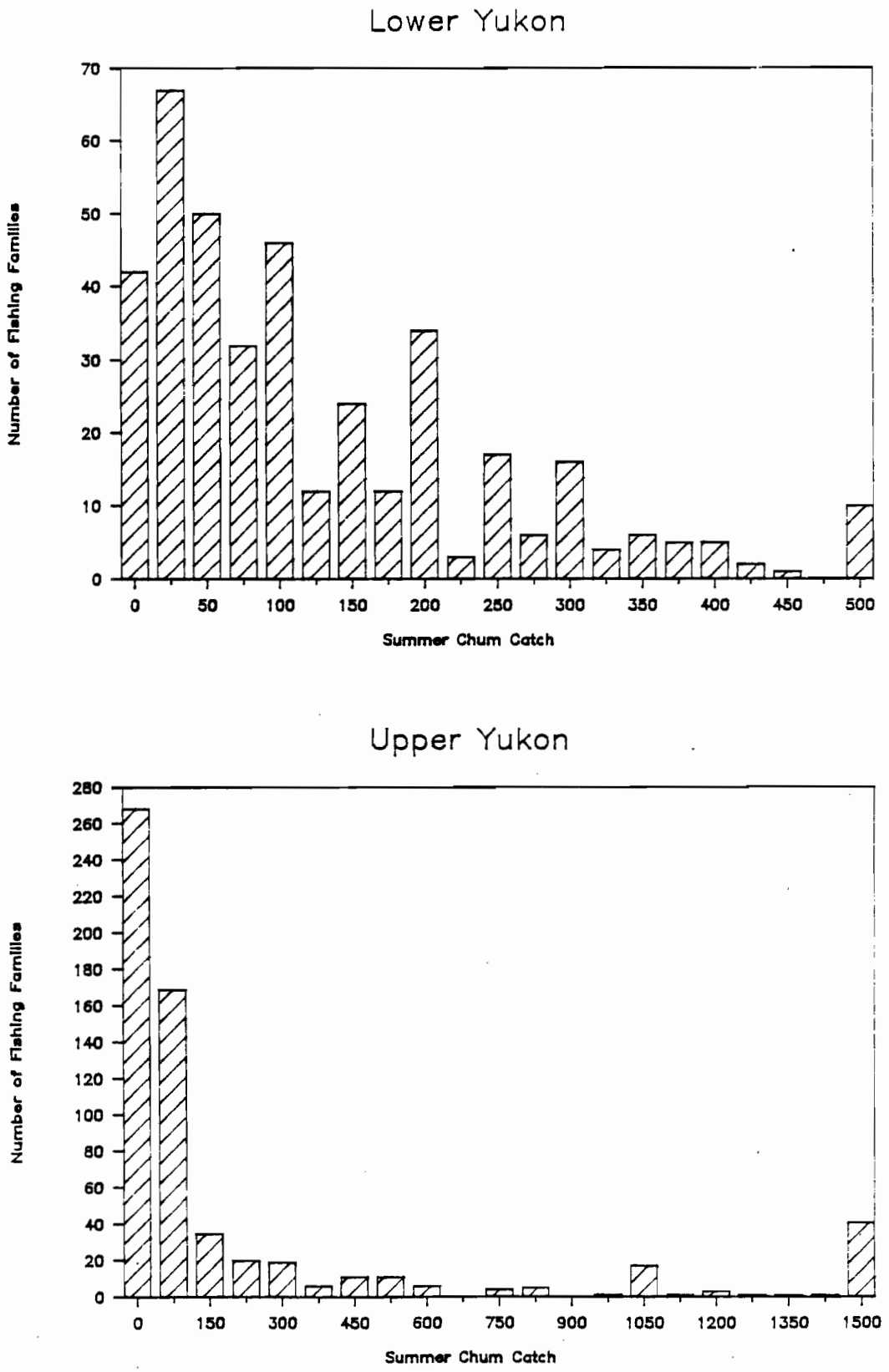

Figure 3. Histogram of 1987 summer chum salmon catches in number of fish per fishing family in the Lower and Upper Yukon areas of the Yukon River, Alaska. The last bar on each graph also includes catches greater than 500 or 1500.

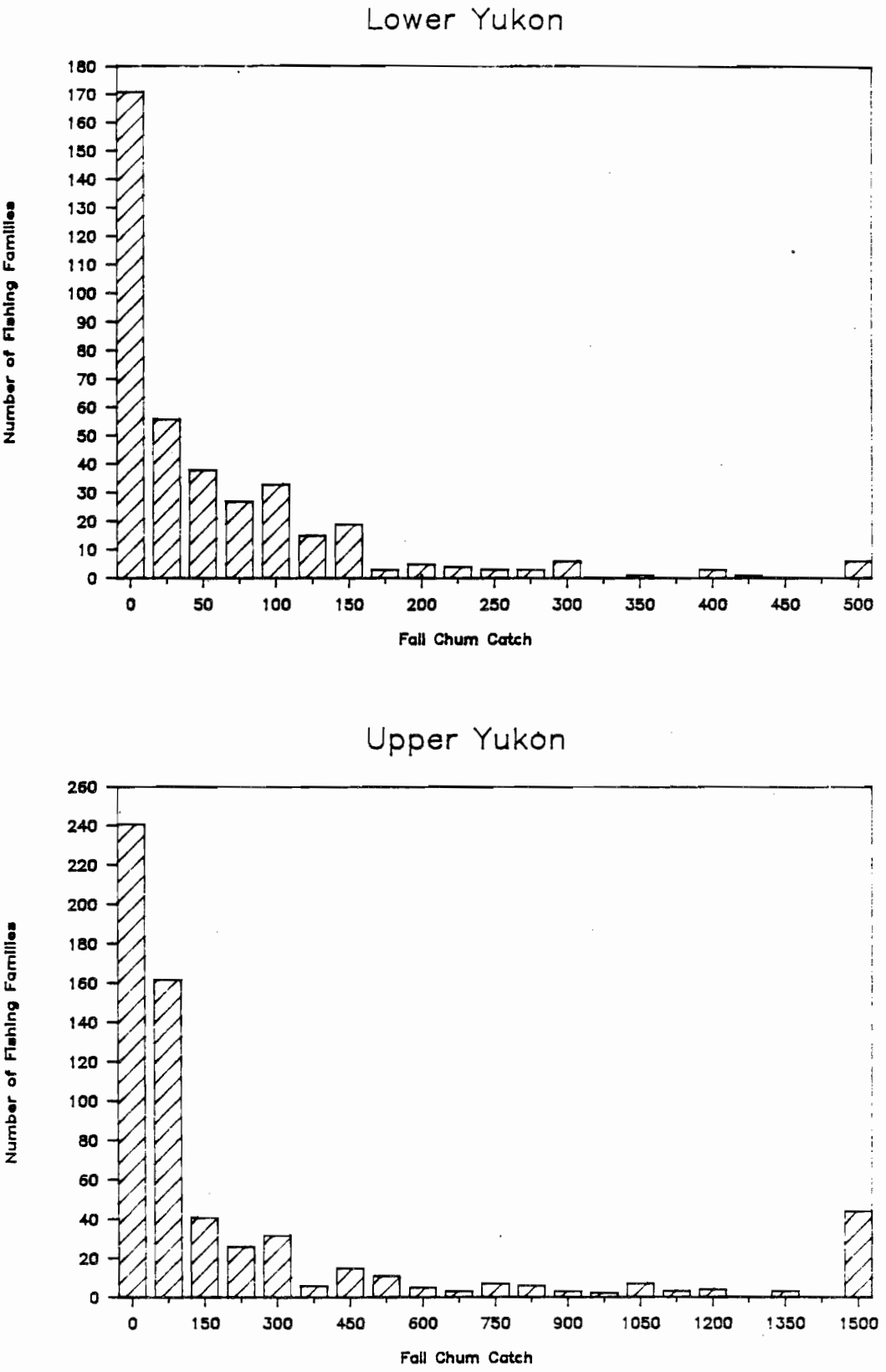

Figure 4. Histogram of 1987 fall chum salmon catches in number of fish per fishing family in the Lower and Upper Yukon areas of the Yukon River, Alaska. The last bar on each graph also includes catches greater than 500 or 1,500.

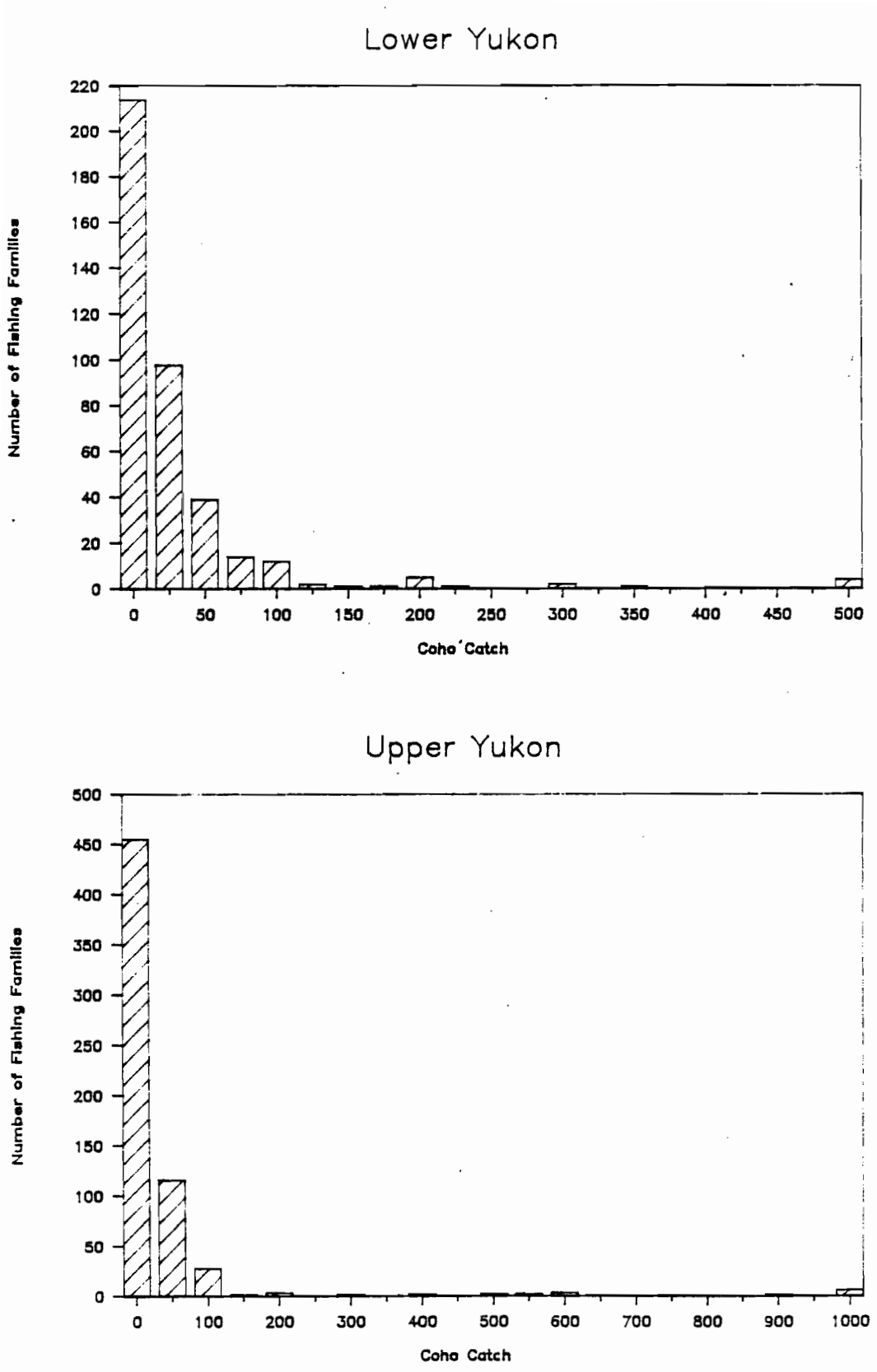

Figure 5. Histogram of 1987 coho salmon catches in number of fish per fishing family in the Lower and Upper Yukon areas of the Yukon River, Alaska. The last bar on each graph also includes catches greater than 500 or 1,000.

Table 3. Number of families fishing and their median subsistence catch by village in the Yukon River drainage, Alaska, 1987.

District/ Area	Village	Number Sampled for Harvest Data a	Median Catch in Number of Salmon b			
			Chinook	Summer Chum	Fall Chum	Coho
1	Sheldon's Pt.	14	29	93	26	5
	Alakanuk	45	8	100	0	0
	Emmonak	46	9	100	0	0
	Kotlik	55	20	100	50	5
2	Mt. Village	63	16	110	10	2
	Pitka's Pt.	7	30	45	15	5
	St. Marys	40	20	123	0	0
	Pilot Station	39	45	36	0	0
	Marshall	37	39	40	40	11
3	Russian Mission	19	45	50	0	0
	Holy Cross	29	60	40	0	0
4	Anvik	16	18	300	11	0
	Shageluk	17	0	300	0	0
	Grayling	21	30	150	150	0
	Kaltag	17	40	1,200	70	0
	Nulato	23	29	200	50	0
	Koyukuk	12	10	50	40	1
	Galena	30	20	33	69	0
	Ruby	16	33	331	155	0
Koyukuk R.	Huslia	16	4	328	0	0
	Hughes	13	12	200	0	0
	Allakaket	19	5	100	15	0
5	Tanana	37	22	3	760	0
	Rampart	11	250	0	0	0
	Fbks F.C.	37	20	3	8	0
	Stevens Village	16	76	5	0	0
	Beaver	8	40	53	288	0
	Fort Yukon	24	78	0	200	0
	Circle	12	58	13	378	0
	Central	3	40	0	40	0
	Eagle	38	35	0	205	0
Chandalar R.	Venetie	7	0	0	400	0
Black R.	Chalkyitsik	7	0	0	150	0
6	Manley	6	0	0	250	50
	Minto	21	0	0	0	0
	Nenana	14	28	400	500	0
	Fbks-Summer	118	3	10	0	0
	Fbks-Fall	56	0	0	30	23

a Represents only those who reported subsistence catches. Data from personal interviews, catch calendars, postal surveys and returned permits pooled.
b Median catch is reported to the nearest whole fish.

Table 4. Number of families fishing and number that reported subsistence salmon catches by species and by village in the Yukon River drainage, Alaska, 1987.

District/ Area	Village	Number Sampled for Harvest Data a	Number that Reported Catches for			
			Chinook	Summer Chum	Fall Chum	Coho
1	Sheldon's Pt.	14	12	12	9	9
	Alakanuk	45	35	41	22	20
	Emmonak	46	35	41	21	19
	Kotlik	55	51	49	39	32
2	Mt. Village	63	52	61	37	32
	Pitka's Pt.	7	7	7	6	4
	St. Marys	40	36	35	19	17
	Pilot Station	39	36	34	16	11
	Marshall	37	34	33	31	22
3	Russian Mission	19	19	18	9	8
	Holy Cross	29	26	20	14	6
4	Anvik	16	13	13	9	3
	Shageluk	17	7	17	6	4
	Grayling	21	17	14	19	9
	Kaltag	17	15	15	13	0
	Nulato	23	17	16	15	2
	Koyukuk	12	9	9	10	6
	Galena	30	28	21	23	14
	Ruby	16	14	14	13	0
Koyukuk R.	Huslia	16	10	12	6	4
	Hughes	13	10	11	6	0
	Allakaket	19	17	19	11	4
5	Tanana	37	28	19	7	13
	Rampart	11	10	3	5	1
	Fbks F.C.	37	30	22	20	3
	Stevens Village	16	13	8	7	0
	Beaver	8	6	6	5	0
	Fort Yukon	24	23	7	16	3
	Circle	12	11	7	9	0
	Central	3	2	1	2	0
	Eagle	38	30	9	26	0
Chandalar R.	Venetie	7	2	0	7	1
Black R.	Chalkyitsik	7	0	0	6	0
6	Manley	6	1	2	4	3
	Minto	21	8	6	8	6
	Nenana	14	10	9	10	6
	Fbks-Summer	118	79	89	34	31
	Fbks-Fall	56 b	0	0	55	49
Total		1,009	753	700	575	342

a Represents only those who reported subsistence catches. Data from personal interviews, catch calendars, postal surveys and returned permits pooled.
b Some fishing families also reported havests for Fbks-Summer.

Districts 1, 2, 3,and 4. Significantly different catches within a district were attributed to stock availability, personal preferences or gear type differences. For example, District 5 summer chum and coho salmon are not readily available to villages upriver of Fort Yukon.

Village, District and Drainage Harvest and Effort

Drainage wide, the largest subsistence harvests by village were 4,021 chinook salmon in Tanana, 28,887 summer chum salmon in Anvik, 41,825 fall chum salmon in Tanana and 19,592 coho salmon in Nenana (Table 5). The standard deviations were quite small resulting from the high level of coverage by the 1987 survey and the resulting small finite population correction factor. If all fishing families in villages were surveyed the standard deviation was zero. An estimated total of 3,621 chinook, 29,668 summer chum, 222 fall chum and 133 coho salmon were harvested by 149 fishing families in the coastal villages of Scammon Bay and Hooper Bay. An unknown proportion of these fish was bound for river systems outside of the Yukon River drainage, therefore, they were not included as Yukon River catches.

The drainage total salmon harvest in Alaska and its approximate 95% confidence interval was 53,124 (± 2,960) chinook salmon, 275,914 (± 16,721) summer chum salmon, 245,834 (± 18,630) fall chum salmon and 48,603 (± 14,690) coho salmon (Table 6). The 95% confidence intervals presented here are statistical measures that are based on proportion of known fishermen interviewed, and do not address illegal or unknown fishing activity, or the error in recall ability. The largest subsistence catch of chinook salmon occurred in District 5, the summer chum salmon harvest was largest in District 4, and the harvest of fall chum and coho salmon was largest in Districts 5 and 6, respectively. Catches of pink salmon, whitefish and inconnu are presented in Table 7. Typically pink salmon returns are quite small in odd numbered years. It should be understood that the majority of whitefish and inconnu are harvested during the winter months and those catches are not reported here.

Throughout the drainage both large and small mesh gill nets were used to target either chinook or chum salmon (Table 8) though more fishermen used small mesh gill nets (992) than large mesh (659). A total of 196 fish wheels was used in upper Yukon Districts 4-6. There was a total of 1.5 units of gear per estimated fishing family.

There was a total of 5,598 dogs owned by subsistence fishing families (Table 8). The majority of dogs were owned by fishing families residing in the Upper Yukon area. Approximately 26% of the dogs were owned by fishing families in District 5.

In the Lower Yukon area 139 (37%), 181 (48%), and 55 (15%) of the fishing families responding to the survey utilized set nets, drift nets and both gear types, respectively (Table 9). Fishing families in Districts 2 and 3 were more likely to operate drift gill nets. Set nets were the dominant gear type in District 1. Overall approximately two-thirds of respondents in the Lower Yukon area had a commercial fisherman in the family. The

Table 5. Estimated total subsistence catch, its standard deviation, and number of subsistence fishing families by village in the Yukon River drainage, Alaska, 1987.

District/ Area	Village	Fishing Families		Catch in Number of Salmon							
				Chinook		Summer Chum		Fall Chum		Coho	
		Number	SD	Total	SD	Total	SD	Total	SD	Total	SD
1	Sheldon's Pt.	18	0.1	1,173	182	2,460	295	882	160	308	56
	Alakanuk	80	1.3	1,180	171	9,913	1,071	3,748	641	1,116	220
	Emmonak	68	0.6	2,518	174	11,177	735	8,160	1,216	3,497	615
	Kotlik	57	0.0	2,407	0	7,210	0	5,677	0	1,475	0
2	Mt. Village	90	0.7	2,252	179	12,456	671	4,897	600	2,481	352
	Pitka's Pt.	9	0.3	380	76	1,184	257	1,143	328	273	101
	St. Marys	58	0.6	2,077	171	11,218	1,004	2,823	557	1,467	308
	Pilot Station	45	0.3	2,593	166	4,279	309	583	71	300	35
	Marshall	55	0.9	2,564	207	3,997	481	4,008	506	2,373	513
3	Russian Mission	24	0.4	2,036	306	2,283	351	1,255	318	423	88
	Holy Cross	35	0.2	2,625	168	1,878	200	1,598	180	259	50
4	Anvik	16	0.0	428	0	28,887	0	394	0	405	0
	Shageluk	17	0.0	47	0	8,015	0	434	0	72	0
	Grayling	24	0.0	1,322	153	21,264	3,230	4,750	377	599	95
	Kaltag	18	0.0	1,117	57	28,550	2,066	7,474	720	0	0
	Nulato	28	0.3	1,573	241	16,299	2,905	2,200	252	85	29
	Koyukuk	14	0.0	609	130	9,718	2,166	2,492	364	894	223
	Galena	34	0.2	1,270	102	11,776	1,331	10,509	1,489	1,349	204
	Ruby	17	0.0	927	64	8,786	623	11,000	1,034	0	0
Koyukuk R.	Huslia	18	0.0	182	19	11,042	1,090	585	76	124	25
	Hughes	13	0.0	177	0	4,369	0	586	0	0	0
	Allakaket	20	0.0	309	24	8,700	585	1,477	139	23	3
5	Tanana	38	0.0	4,021	157	10,876	516	41,825	1,275	6,680	459
	Rampart	12	0.1	2,815	178	2,434	415	5,092	818	81	23
	Fbks F.C.	39	0.1	2,287	144	5,755	625	21,014	2,130	64	11
	Stevens Village	20	0.0	2,076	208	1,446	287	7,538	1,359	0	0
	Beaver	8	0.0	466	0	657	0	5,750	0	0	0
	Fort Yukon	30	0.3	3,950	466	1,187	323	15,200	1,855	41	18
	Circle	13	0.0	1,448	170	1,990	444	7,518	967	0	0
	Central	3	0.0	166	0	88	0	173	0	0	0
	Eagle	44	0.1	2,020	150	417	86	19,678	1,654	0	0
Chandalar R.	Venetie	8	0.0	13	4	0	0	2,774	126	17	6
Black R.	Chalkyitsik	8	0.0	0	0	0	0	2,686	565	2	1
6	Manley	8	0.0	40	20	267	84	4,267	1,082	1,467	419
	Minto	22	0.1	374	31	1,383	129	5,419	445	671	56
	Nenana	41	0.9	3,151	1,192	21,214	6,018	26,909	8,099	19,592	7,399
	Fbks-Summer	123	0.2	531	12	2,739	69	1,258	54	969	48
	Fbks-Fall	60 a	0.2	0	0	0	0	2,058	62	1,496	46

a Some fishing families also reported catches for Fbks-Summer.

Table 6. Estimated subsistence harvest, its standard deviation, and number of fishing families by district/area in the Yukon River drainage, Alaska, 1987.

		Numbers of Salmon							
	Number of Fishing	Chinook		Summer Chum		Fall Chum		Coho	
District/Area	Families	Total	SD	Total	SD	Total	SD	Total	SD
1	223	7,278	304	30,760	1,332	18,467	1,384	6,396	656
2	257	9,866	371	33,134	1,361	13,454	1,019	6,894	702
3	59	4,661	349	4,161	404	2,853	365	682	101
Lower Yukon Total	539	21,805	593	68,055	1,946	34,774	1,757	13,972	966
4	168	7,293	341	133,295	5,476	39,253	2,035	3,404	318
Koyukuk River	51	668	31	24,111	1,237	2,648	158	147	25
5	207	19,249	624	24,850	1,105	123,788	3,974	6,866	460
Chandalar/Black R.	16	13	4	0	0	5,460	579	19	6
6 (Tanana R.)	254	4,096	1,193	25,603	6,020	39,911	8,183	24,195	7,411
Upper Yukon Total	696	31,319	1,389	207,859	8,306	211,060	9,341	34,631	7,432
Lower 95% C.I. a		50,164		259,193		227,204		33,913	
Total	1,235	53,124	1,510	275,914	8,531	245,834	9,505	48,603	7,495
Upper 95% C.I.		56,084		292,635		264,464		63,293	

a C.I. = Confidence interval based on a normal statistic of 1.96. The precision implied by the width of this confidence interval does not take into account the accuracy of a fishermen's recalled harvest.
b Number of fishing families is over estimated because some families using permits in the Tanana River reported catches for both Fbks-Summer and Fbks-Fall.

Table 7. Estimated subsistence harvest of pink salmon, whitefish, and inconnu by village in the Yukon River drainage, Alaska, 1987.

District/ Area	Village	Catch in Numbers of Fish		
		Pink Salmon	Whitefish	Inconnu
1	Sheldon's Pt.	6	311	48
	Alakanuk	30	674	364
	Emmonak	242	127	83
	Kotlik	2	523	1,324
2	Mt. Village	36	948	260
	Pitka's Pt.	124	56	19
	St. Marys	98	77	132
	Pilot Station	2	1,019	164
	Marshall	38	640	284
3	Russian Mission	0	a	145
	Holy Cross	1	603	57
4	Anvik	0	330	75
	Shageluk	0	1,413	272
	Grayling	0	2,073	162
	Kaltag	0	607	59
	Nulato	0	1,229	126
	Koyukuk	0	463	20
	Galena	0	3,839	328
	Ruby	0	1,328	122
Koyukuk R.	Huslia	0	2,172	416
	Hughes	0	1,625	245
	Allakaket	0	2,935	636
5	Tanana	0	11,091	1,620
	Rampart	0	289	40
	Fbks F.C.	0	1,947	532
	Stevens Village	0	188	50
	Beaver	0	41	65
	Fort Yukon	0	918	215
	Circle	0	105	25
	Central	0	4	0
	Eagle	0	66	5
Chandalar R.	Venetie	0	1	2
Black R.	Chalkyitsik	0	82	7
6	Manley	0	301	1
	Minto	0	1,275	139
	Nenana	0	7,157	79
	Fbks-Summer	0	29	5
	Fbks-Fall	0	55	2
Totals		579	46,541	8,128

a Data not collected.

Table 8. Estimated number of subsistence fishing families, amount of gear owned, and number of dogs per village in the Yukon River drainage, Alaska, 1987. a

District/ Area	Village	Fishing Families	Gill Nets b		Fish Wheels	Dogs
			Large Mesh	Small Mesh		
1	Sheldon's Pt.	18	9	21	0	45
	Alakanuk	80	21	85	0	140
	Emmonak	68	36	58	0	104
	Kotlik	57	48	63	0	176
2	Mt. Village	90	34	103	0	185
	Pitka's Pt.	9	7	11	0	78
	St. Marys	58	26	53	0	216
	Pilot Station	45	41	44	0	154
	Marshall	55	48	58	0	465
3	Russian Mission	24	20	21	0	81
	Holy Cross	35	32	19	0	78
4	Anvik	16	8	9	7	117
	Shageluk	17	3	19	0	98
	Grayling	24	15	23	7	215
	Kaltag	18	12	6	13	120
	Nulato	28	20	11	18	130
	Koyukuk	14	8	8	4	61
	Galena	34	23	12	13	112
	Ruby	17	6	4	10	188
Koyukuk R.	Huslia	18	5	21	0	190
	Hughes	13	3	13	0	37
	Allakaket	20	7	25	0	161
5	Tanana	38	31	12	24	511
	Rampart	12	10	4	4	170
	Fbks F.C.	39	43	24	14	c
	Stevens Village	20	15	8	6	90
	Beaver	8	4	3	4	50
	Fort Yukon	30	23	6	16	281
	Circle	13	8	4	7	70
	Central	3	3	2	0	1
	Eagle	44	30	34	3	276
Chandalar R.	Venetie	8	0	10	0	58
Black R.	Chalkyitsik	8	0	9	0	53
6	Manley	8	3	3	5	124
	Minto	22	4	11	6	196
	Nenana	41	9	29	26	567
	Fbks-Summer	123	44	91	4	c
	Fbks-Fall	60 d	0	55	5	c
Total		1,235 d	659	992	196	5,598

a Survey interviews and questionnaires asked for the number of nets and fishwheels owned and operated at least once during the fishing season.
b Large mesh gill nets are larger than 6 in mesh and small mesh nets are 6 in or less.
c Data not available.
d Some fishing families reported catches for both Fbks-Summer and Fbks-Fall.

Table 9. Number of families fishing for subsistence, their fishing method, and number of families that also fish commercially by village in the Lower Yukon River area, Alaska, 1987.

District/ Area	Village	Number Sampled for Harvest Data a	Fishing Method				Number of Subsistence Families b		
			Set Net	Drift Net	Drift & Set	Unknown	Commercial	Non-Commercial	Unknown
1	Sheldon's Pt.	14	8	3	2	1	10	4	0
	Alakanuk	45	27	7	7	4	33	9	3
	Emmonak	46	18	22	2	4	38	7	1
	Kotlik	55	43	8	3	1	31	23	1
2	Mt. Village	63	10	44	7	2	43	19	1
	Pitka's Pt.	7	1	4	2	0	5	2	0
	St. Marys	40	3	23	10	4	24	13	3
	Pilot Station	39	7	23	7	2	27	10	2
	Marshall	37	5	27	5	0	28	9	0
3	Russian Mission	19	5	5	9	0	5	14	0
	Holy Cross	29	12	15	1	1	6	22	1
Total		394	139	181	55	19	250	132	12

a Represents only those who reported catches.

b Survey interviews asked whether anyone in the fishing family fished for commercial purposes in addition to fishing for subsistence.

majority of fishing families in District 3 villages had no member that fished commercially.

Special Area and Permit Harvest

Postseason interviews of 36 fishing families in the village of Minto indicated 23 had fished. An estimated total of 1,461 northern pike was harvested from 10 June to 5 November 1987. A total of 1,275 whitefish and 139 inconnu was harvested during the same time period.

Permits were issued to subsistence and personal-use fishermen in three areas of the Upper Yukon River drainage (Table 10). The largest permit harvests were 3,602 chinook and 27,369 fall chum salmon taken by subsistence-use fishing families within District 5 (22 Mile slough-U.S./Canada border), 4,262 summer chum salmon taken by personal-use fishing families also within District 5 (Hess Creek - Dall River) and 2,465 coho salmon taken by personal-use fishing families within District 6 (Wood River - upstream). Significantly different catches within a district could be attributed to stock availability and personal preference.

A total of 460 subsistence and personal use permits was issued in 1987. Sixty fishermen in the permit area in the Tanana River near Fairbanks were issued both subsistence and personal use permits. A total of 273 fishermen reported catches, 113 did not fish and 14 fishermen failed to report. Additionally, 20 carcass permits were issued to fishermen for the Delta River and vicinity. An estimated 1,931 fall chum carcasses were harvested by 13 fishermen, 4 did not participate and three did not report. These fish are not added to the subsistence harvest since they were taken after spawning.

Historic Subsistence Harvest Levels and Distribution

Subsistence catches have been estimated since 1961 for chinook salmon and all other salmon pooled and reported as "small" salmon (Table 11). Beginning in 1977, there has been separate accounting by summer and fall run chum salmon and coho salmon. Subsistence catches of all species appear to have been depressed from the mid 1960's through 1977. Thereafter catches have increased steadily through the 1980's, returning to levels of the early 1960's for "other" salmon and establishing record harvests of chinook salmon. Increased catches since the mid-1970's of all fish could be partially attributed to the resurgence in the number of dog teams as well as an overall increase of the human population along the entire river. This change in harvest level from the mid-1960's has been accompanied by a change in distribution of the catch within the drainage.

It is necessary to predict future levels of subsistence fishing in order to insure adequate escapement and the priority use of the Yukon River fisheries resources for subsistence purposes. Unlike the commercial fishery there is very little in-season reporting of subsistence catches. Final harvest estimates are often not available until mid-winter. Therefore, it becomes necessary to anticipate future utilization levels,

Table 10. Number of subsistence and personal-use permits, estimated harvest, and amount of gear owned and operated at least once in the Yukon and Tanana River drainages, Alaska, 1987. a

Permit Area	Use	Permits Issued	Permits Used	Chinook	Summer Chum	Fall Chum	Coho	Total Salmon	Gill nets Large Mesh	Gill nets Small Mesh	Fish Wheels
Fbks. F.C. b	Subs.	16	14	1,818	2,091	7,631	6	11,546	16	5	6
Yukon River	Pers.	42	33	1,674	4,262	15,750	58	21,744	34	21	9
(Hess Cr.-Dall R.)											
Eagle/Circle/Central	Subs. c	51	58	3,602	2,495	27,369	0	33,466	40	40	10
Yukon River	Pers.	2	2	32	0	0	0	32	1	0	0
(22 mi. Slough-Border)											
Fairbanks & vicinity	Subs.	217	123	531	2,739	0	0	3,270	44	91	4
Tanana River	Pers.	132 d	60 e	0	0	3,316	2,465	5,781	0	55	5
(Wood R.-upstream)											
Totals	Subs.	284	195	5,951	7,325	35,000	6	48,282	100	136	20
	Pers.	176 d	95 e	1,706	4,262	19,066	2,523	27,557	35	76	14

a Personal-use permits were only required for fall chum salmon in 1987.

b Includes fishermen with permits from Stevens Village and Rampart.

c Seven fishermen without permits reported catches.

d Includes 60 former subsistence fishermen who were reissued permits to fish fall chums for personal-use.

e Some fishing families used both subsistence and personal-use permits.

Table 11. Estimated total subsistence catch and number of subsistence fishing families in the Yukon River drainage, Alaska, 1961-1987.

Year	Fishing Families	Catch in Number of Salmon a				
		Chinook	Summer Chum	Fall Chum	Coho	Small Salmon
1961		21,488				405,357
1962		11,110				347,244
1963		24,862				392,780
1964		16,231				479,124
1965		16,608				446,297
1966		11,572				206,011
1967		16,448				274,977
1968		12,106				178,507
1969		14,000				208,254
1970		13,874				222,005
1971		25,684				228,649
1972		20,258				144,008
1973		24,317				212,337
1974		19,964				315,198
1975		13,045				287,299
1976		17,806				259,197
1977 b	690	17,581	159,502	82,771	16,333	258,606
1978 b	985	30,297	197,144	94,867	7,787	299,798
1979	1,105	31,005	196,187	233,347	9,794	439,328
1980	1,131	42,724	272,398	172,657	20,158	465,213
1981	1,059	29,690	208,284	188,525	21,228	418,037
1982	1,071	28,158	260,969	132,897	35,894	429,760
1983	1,087	49,478	240,386	192,928	23,895	457,209
1984	1,064	42,428	230,747	174,823	49,020	454,590
1985	1,019	39,771	264,828	206,472	32,264	503,564
1986	1,185	45,238	290,825	164,043	34,468	489,336
1987	1,235 c	53,124	275,914	245,834	48,603	570,351
5 Year Avg (1982-1986)	1,085	41,015	257,551	174,233	35,108	466,892

a Subsistence catch was not seperated by run of chum or coho salmon before 1977 and was reported as "small" salmon.

b Surveys were conducted prior to the end of the fall chum and coho salmon fishing season.

c Number of fishing families is a maximum estimate because some of the 60 families using personal-use permits in the Tanana River for fall chum salmon also used subsistence permits during the summer chum and chinook season, resulting in double-counting of these families.

distribution and timing of the subsistence harvest based on historical catch trends throughout the drainage.

Chinook Salmon

The most dramatic and steady long term increase in subsistence harvest has been for chinook salmon (Table 11). Increased catches have been observed in all districts (Appendix A.1) and the average annual harvest has more than doubled from that of the period 1961-1972 of 17,020 chinook salmon to 41,015 fish for the recent 5-year average (1982-1986). The largest harvest on record was 53,124 chinook salmon taken in 1987. There has also been some change in the distribution of catch (Table 12). The proportion taken in District 6 has increased over time converging with the proportions taken in Districts 1 through 4. The largest proportion of the total harvest has consistently been taken in District 5.

Summer Chum Salmon

The subsistence catch of summer chum salmon in the Yukon River has increased from 159,502 fish in 1977 to 290,825 in 1986 (Table 11). The increased catch is most evident in District 4 (Table 12 and Appendix A.2) which consistently accounts for more than 40% of the Yukon River summer chum subsistence harvest.

The yearly fluctuation in drainage wide catch is in most part due to variation in the level of harvest in District 4. The commercial fishery for summer chum salmon roe in District 4 since 1980 has greatly increased the subsistence catch in that district as fishermen attempt to use the surplus carcasses. In comparison, the summer chum subsistence catch has changed little in the other districts. The next highest proportion of drainage wide catch is taken in District 2.

Fall Chum Salmon

Fall chum salmon subsistence catches have averaged 190,000 since 1979, ranging from 132,897 in 1982 to 245,834 fish in 1987 (Table 11 and Appendix A.3). There has been some change in the distribution of catches throughout the drainage. The proportion taken in District 6 declined from 1977 through 1981 and the proportion taken in Districts 5 and 4 have increased (Table 12). The greatest proportion of the catch is taken in District 5, averaging 52 percent for the period 1977-1987. District 3 takes the smallest share, averaging 1 percent (1977-1987).

Coho Salmon

Reported subsistence catches have increased greatly over the last 10 years (Table 11). The 1982-1986 average of 35,108 was over double the previous 5-year average of 15,060 (1977-1981). Much of the increase is due to increased catches in Districts 5 and 6 (Appendix A.4). There is a question of whether increased coho catches are a result of better reporting as fishermen begin to differentiate them from fall chum in their subsistence catches, or represent an increase in stock abundance, as the commercial

Table 12. Subsistence catch in number of salmon expressed as percent of total yearly harvest by district for each major salmon group harvested in the Yukon River drainage, Alaska, 1977-1987. a

Percent of Total Chinook Catch

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	Mean(77-87)
1	4.3	17.7	9.5	8.7	7.9	8.5	13.1	11.3	8.0	11.9	13.9	10.4
2	9.7	13.4	14.0	8.8	12.3	7.7	18.9	17.5	9.0	14.6	18.8	13.2
3	14.8	13.1	10.7	11.4	13.8	12.3	10.2	10.7	8.7	9.6	8.9	11.3
4	26.7	16.7	22.0	25.0	13.1	15.4	17.2	15.3	16.1	19.5	13.9	18.3
5	35.5	35.0	39.4	41.8	45.7	47.1	34.9	36.5	39.1	35.9	36.7	38.9
6	9.0	4.1	4.4	4.4	7.2	9.0	5.6	8.8	19.1	8.4	7.8	8.0

Percent of Total Summer Chum Catch

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	Mean(77-87)
1	10.1	17.8	10.3	6.7	6.3	7.8	11.4	14.3	10.5	14.7	12.2	11.1
2	14.8	12.5	14.8	5.8	7.9	7.8	12.7	13.6	8.6	15.7	13.2	11.6
3	4.6	1.0	1.9	1.4	2.8	2.5	2.1	3.7	1.6	2.1	1.6	2.3
4	48.6	49.8	53.9	78.4	61.7	74.4	51.6	40.9	57.0	52.8	52.9	56.5
5	17.5	12.1	15.2	3.6	15.2	4.1	11.1	15.8	11.7	8.3	9.9	11.3
6	4.3	6.8	3.9	4.1	6.1	3.6	11.0	11.8	10.7	6.5	10.2	7.2

Percent of Total Fall Chum Catch

District	1977 b	1978 b	1979	1980	1981	1982	1983	1984	1985	1986	1987	Mean(77-87)
1	6.5	0.4	7.0	4.5	8.6	7.7	4.6	5.5	6.5	5.8	7.8	5.9
2	7.6	1.4	6.5	7.6	6.5	7.3	5.8	7.0	5.7	8.6	5.7	6.3
3	0.6	0.3	1.1	1.4	1.6	1.3	1.6	1.4	1.1	1.1	1.2	1.2
4	8.5	9.6	14.9	10.6	9.9	14.1	15.9	14.2	11.3	15.0	16.5	12.8
5	38.0	54.4	47.5	45.0	58.5	54.6	54.3	58.0	57.3	53.4	52.1	52.1
6	38.8	33.9	23.0	30.7	14.8	15.0	17.9	14.0	18.1	16.1	16.8	21.7

Percent of Total Coho Catch

District	1977 b	1978 b	1979	1980	1981	1982	1983	1984	1985	1986	1987	Mean(77-87)
1	15.0	14.7	32.5	9.7	18.0	31.5	15.3	12.5	10.1	7.9	13.2	16.4
2	26.5	7.7	11.6	25.8	17.8	28.8	26.0	14.5	15.1	26.6	14.2	19.5
3	2.2	2.9	0.1	0.5	2.3	1.9	3.9	1.5	1.2	2.3	1.4	1.8
4	26.7	1.9	2.6	33.3	9.6	7.3	14.7	5.0	11.5	7.5	7.0	11.6
5	4.9	12.5	6.1	3.0	8.2	9.6	10.5	36.0	25.3	17.0	14.2	13.4
6	24.7	60.5	47.1	27.7	44.1	20.9	29.6	30.4	36.7	38.7	50.0	37.3

a Does not include catches in Koyukuk, Innoko, Chandalar, and Black River drainages.
b Surveys were conducted prior to the end of the fall chum and coho salmon fishing season.

catch of coho has also increased. The Department programs which index abundance have also indicated an increase (ADF&G 1986) in coho run size in recent years.

The distribution of the coho catch across districts has varied yearly. The proportion caught in District 1 has declined over the last 5 years while District 6 has increased (Table 12). On average (1977-1987) District 6 takes the largest proportion with 37% and District 3 the smallest with less than 2%.

Future Harvest Levels and Distribution

Fishery managers, in their role to control exploitation, have used the most recent 5-year average to predict subsistence catches for the next year. Of course, ultimate future harvests will depend on the abundance of the target stocks and availability of alternative species. For example, the increased utilization of coho salmon in District 6 has coincided with the decline in fall chum salmon. Following this approach fishery managers may recognize changes in trends and adjust management strategies accordingly.

One would expect to see the largest proportion of the chinook catch to be taken in District 5 (39%), the summer chum catch in District 4 (57%), the fall chum catch in District 5 (52%), and the coho catch in District 6 (37%), based on historical distribution of harvests.

CONCLUSION

It is difficult to conclude on the accuracy of the survey. However, the reintroduction of the catch calendar and the relatively high number of fishermen contacted has most likely increased the overall accuracy of the 1987 survey.

We can further assess the accuracy and precision of the subsistence harvest estimates by contacting fishermen of unknown fishing status ("Code 5") during the following survey year and asking if they fished in the preceding year. Catch data is not necessary as their recall would be in question. Another way of increasing survey accuracy requires preseason community contact with fishing households to develop complete lists of subsistence fishing participants. Further, fishermen in each community should be stratified using the village median catch to distribute estimated harvest symmetrically. Since the mean can be sensitive to a few extremely large or small values, the median may be a better statistic to identify catch distribution allowing for increased precision in estimating total harvest.

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APPENDIX A: HISTORICAL SUBSISTENCE HARVEST DATA

Appendix A.1 Subsistence catch of chinook salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987.

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Sheldons Pt.	302	546	91	427	163	79	1,021	802	143	592	1,173	527
Alakanuk	213	1,125	893	1,595	423	336	1,582	1,028	517	1,027	1,180	898
Emmonak	62	2,738	1,362	1,175	1,021	1,328	2,436	2,099	1,382	1,754	2,518	1,800
Kotlik	173	837	533	472	675	568	1,224	695	1,029	1,902	2,407	1,084
Y-1 Subtotal	750	5,246	2,879	3,669	2,282	2,311	6,263	4,624	3,071	5,275	7,278	4,309
Mt. Village	172	817	1,025	843	811	218	1,875	1,217	672	1,367	2,252	1,070
Pitkas Pt.·	87		390	241	312	373	254	996	83	274	380	396
St. Marys a	489	1,314	1,328	1,056	1,068	612	2,178	1,667	695	1,443	2,077	1,319
Pilot Station	556	1,027	804	433	399	428	2,703	1,116	896	1,452	2,593	1,319
Marshall	364	806	721	1,101	990	478	2,055	2,176	1,122	1,947	2,564	1,556
Y-2 Subtotal	1,668	3,964	4,268	3,674	3,580	2,109	9,065	7,172	3,468	6,483	9,866	5,659
Russian Mission	639	1,498	1,476	1,660	1,689	1,628	2,634	1,938	974	1,747	2,036	1,784
Holy Cross	1,920	2,404	1,787	3,123	2,312	1,731	2,276	2,456	2,368	2,505	2,625	2,267
Y-3 Subtotal	2,559	3,902	3,263	4,783	4,001	3,359	4,910	4,394	3,342	4,252	4,661	4,051
Lower Yukon Total	4,977	13,112	10,410	12,126	9,863	7,779	20,238	16,190	9,881	16,010	21,805	14,020
Anvik	67	180	261	161	191	354	744	576	405	959	428	608
Shageluk			62	35	10					53	47	18
Grayling	149	292	391	3,664	222	294	951	879	903	1,837	1,322	973
Kaltag	216	127	435	694	179	344	652	487	669	1,080	1,117	646
Nulato	1,531	1,354	1,245	2,297	1,117	811	1,135	966	1,063	1,835	1,573	1,162
Koyukuk	752	518	495	699	541	493	966	1,009	194	569	609	646
Galena	1,155	945	1,591	1,205	570	735	1,477	1,226	1,329	1,046	1,270	1,163
Ruby	735	1,539	2,221	1,736	964	1,168	2,346	1,107	1,657	1,263	927	1,508
Y-4 Subtotal	4,605	4,955	6,701	10,491	3,794	4,199	8,271	6,250	6,220	8,642	7,293	6,716

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Appendix A.1. Subsistence catch of chinook salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987 (Continued).

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Tanana	858	1,851	1,604	5,711	2,517	2,230	5,547	2,682	1,248	1,672	4,021	2,676
Rampart	1,194	987	1,820	1,169	488	887	1,070	876	1,302	1,700	2,815	1,167
Fbks. F.C.	467	1,333	899	1,350	1,095	1,935	2,672	2,499	1,865	1,762	2,287	2,147
Stevens V	775	1,845	1,295	2,612	1,292	1,810	2,531	2,177	2,763	2,839	2,076	2,424
Beaver	299	558	394	506	552	250	220	553	506	708	466	447
Ft. Yukon	1,061	2,642	1,922	2,527	2,794	1,894	1,887	3,608	2,900	3,083	3,950	2,674
Circle	304	212	1,175	769	728	969	648	545	2,259	2,233	1,614	1,331
Eagle	1,171	963	2,888	2,880	3,782	2,864	2,183	1,998	2,247	1,915	2,020	2,241
Y-5 Subtotals	6,129	10,391	11,997	17,524	13,248	12,839	16,758	14,938	15,090	15,912	19,249	15,107
Manley	752	298	269	410	367	386	990	282	744	621	40	605
Minto				354	344	411	275	440	1,386	350	374	572
Nenana	742	807	800	771	974	1,195	966	2,556	4,919	2,093	3,151	2,346
Fairbanks	81	126	264	291	400	451	475	321	326	637	531	442
Y-6 Subtotal	1,575	1,231	1,333	1,826	2,085	2,443	2,706	3,599	7,375	3,701	4,096	3,965
Huslia	50	132	146	154	61	125	459	169	144	82	182	196
Hughes	72	216	180	226	402	479	318	856	778	296	177	545
Allakaket	173	246	238	217	185	274	706	375	283	563	309	440
Koyukuk R. Subtotal	295	594	564	597	648	878	1,483	1,400	1,205	941	668	1,181
Venetie	0	14	0	160	52	20	22	51		32	13	31
Chalkyitsik										0	0	0
Subtotal Chandalar/Black R.	0	14	0	160	52	20	22	51		32	13	31
Upper Yukon Total	12,604	17,185	20,595	30,598	19,827	20,379	29,240	26,238	29,890	29,228	31,319	26,995
Yukon Total	17,581	30,297	31,005	42,724	29,690	28,158	49,478	42,428	39,771	45,238	53,124	41,015

a Pitkas Pt. and St. Marys catches combined in 1978.

Appendix A.2 Subsistence catch of summer chum salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987.

Village	1977	1978 a	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave *(1982-86)
Sheldons Pt.	842	3,385	610	907	2,495	885	1,690	2,701	1,717	4,755	2,460	2,350
Alakanuk	5,569	9,408	4,615	3,343	2,263	5,225	9,347	10,095	7,702	11,280	9,913	8,730
Emmonak	4,370	9,601	6,084	4,915	4,907	8,426	8,401	10,053	8,742	12,618	11,177	9,648
Kotlik	4,278	8,503	4,835	6,807	1,645	3,916	5,241	5,610	6,188	10,201	7,210	6,231
Y-1 Subtotal	15,059	30,897	16,144	15,972	11,310	18,452	24,679	28,459	24,349	38,854	30,760	26,959
Mt. Village	5,959	6,362	8,043	3,090	3,383	3,854	10,183	8,665	6,745	11,468	12,456	8,183
Pitkas Pt.-	2,904		2,131	289	586	1,418	982	2,129	945	1,973	1,184	1,489
St. Marys b	7,055	9,494	6,167	3,327	4,113	7,987	7,587	8,890	6,611	13,013	11,218	8,818
Pilot Station	4,226	3,810	3,193	2,545	2,859	2,135	4,683	3,236	3,133	7,870	4,279	4,211
Marshall	1,850	2,018	3,742	4,430	3,277	3,048	3,961	4,076	2,361	7,172	3,997	4,124
Y-2 Subtotal	21,994	21,684	23,276	13,681	14,218	18,442	27,396	26,996	19,795	41,496	33,134	26,825
Russian Mission	1,801	856	913	628	2,628	1,419	1,576	2,227	1,817	3,136	2283	2,035
Holy Cross	5,041	850	2,033	2,614	2,301	4,421	3,033	5,124	1,870	2,392	1878	3,368
Y-3 Subtotal	6,842	1,706	2,946	3,242	4,929	5,840	4,609	7,351	3,687	5,528	4,161	5,403
Lower Yukon Total	43,895	54,287	42,366	32,895	30,457	42,734	56,684	62,806	47,831	85,878	68,055	59,187
Anvik	23,394	15,883	12,714	28,051	26,588	27,087	20,592	22,433	24,950	41,581	28,887	27,329
Shageluk			6,585	2,485	2,501					6,710	8,015	2,237
Grayling	16,275	18,365	18,418	29,894	15,836	47,006	22,958	28,060	23,937	35,284	21,264	31,449
Kaltag	15,043	18,127	22,928	53,470	28,121	37,125	27,674	1,800	26,965	24,667	28,550	23,646
Nulato	9,444	8,589	6,054	29,657	7,534	19,740	11,130	232	16,315	10,349	16,299	11,553
Koyukuk	2,752	4,857	5,570	14,416	11,788	18,149	14,440	5,215	9,666	6,250	9,718	10,744
Galena	3,226	8,930	4,218	13,102	15,089	20,434	5,789	19,480	16,212	6,618	11,776	13,707
Ruby	2,204	11,568	8,305	15,084	5,542	7,539	8,804	4,282	13,556	7,883	8,786	8,413
Y-4 Subtotal	72,338	86,319	84,792	186,159	112,999	177,080	111,387	81,502	131,601	139,342	133,295	128,182

-Continued-

Appendix A.2. Subsistence catch of summer chum salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987 (Continued).

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Tanana	8,915	9,297	5,964	5,109	7,873	3,214	5,552	10,620	11,148	11,646	10,876	8,436
Rampart	6,327	1,135	15,300	109	1,946	0	3,698	7,650	5,133	1,450	2,434	3,586
Fbks. F.C.	1,568	6,055	1,202	1,227	4,501	2,056	2,194	4,065	2,027	1,382	5,755	2,345
Stevens V	1,257	1,766	16	520	2,576	666	5,051	5,952	3,046	3,116	1,446	3,566
Beaver	694	102	34	263	146	534	100	167	263	0	657	213
Ft. Yukon	6,390	2,471	749	1,291	8,149	1,434	7,142	3,032	4,410	3,264	1,187	3,856
Circle	1	39	433	48	2,009	0	73	0	930	459	2,078	292
Eagle	888	163	180	27	108	1,887	133	49	39	516	417	525
Y-5 Subtotal	26,040	21,028	23,878	8,594	27,308	9,791	23,943	31,535	26,996	21,833	24,850	22,820
Manley	3,615	3,601	1,939	564	2,972	971	7,245	1,260	856	604	267	2,187
Minto				450	367	808	7,414	5,042	5,291	1,587	1,383	4,028
Nenana	2,716	5,440	1,880	4,945	4,369	3,972	6,779	13,962	15,825	10,827	21,214	10,273
Fairbanks	118	2,729	2,384	3,749	3,239	2,708	2,276	3,177	2,646	4,024	2,739	2,966
Y-6 Subtotal	6,449	11,770	6,203	9,708	10,947	8,459	23,714	23,441	24,618	17,042	25,603	19,455
Huslia	2,949	8,556	19,805	15,063	12,550	6,809	18,588	12,550	13,430	10,516	11,042	12,379
Hughes	4,081	6,387	11,664	10,545	6,196	8,409	1,905	14,744	12,788	7,280	4,369	9,025
Allakaket	3,750	8,797	7,479	9,434	7,827	7,687	4,165	4,169	7,564	8,934	8,700	6,504
Koyukuk R. Subtotal	10,780	23,740	38,948	35,042	26,573	22,905	24,658	31,463	33,782	26,730	24,111	27,908
Venetie	0	0	0	0	0	0	0	0		0	0	0
Chalkyitsik										0	0	0
Subtotal Chandalar/Black R.	0	0	0	0	0	0	0	0		0	0	0
Upper Yukon Total	115,607	142,857	153,821	239,503	177,827	218,235	183,702	167,941	216,997	204,947	207,859	198,364
Yukon Total	159,502	197,144	196,187	272,398	208,284	260,969	240,386	230,747	264,828	290,825	275,914	257,551

a Includes 1,478 pink salmon.

b Pitkas Pt. and St. Marys catches combined in 1978.

Appendix A.3. Subsistence catch of fall chum salmon, in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987.

Village	1977 a	1978 a	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Sheldons Pt.	285	0	1,072	1,249	490	886	233	555	713	259	882	529
Alakanuk	634	148	5,841	1,227	4,913	1,336	903	1,219	2,603	2,030	3,748	1,618
Emmonak	2,099	83	5,182	2,016	4,375	4,458	2,715	3,329	4,539	2,746	8,160	3,557
Kotlik	2,067	159	3,693	2,941	5,762	3,336	4,387	3,782	5,420	3,965	5,677	4,178
Y-1 Subtotal	5,085	390	15,788	7,433	15,540	10,016	8,238	8,885	13,275	9,000	18,467	9,883
Mt. Village	3,532	556	5,144	5,719	3,794	2,810	4,065	3,497	3,591	2,947	4,897	3,382
Pitkas Pt.	8		1,197	608	319	901	342	1,186	621	156	1,143	641
St. Marys b	1,309	311	2,332	2,660	3,003	1,485	2,796	2,741	2,694	5,245	2,823	2,992
Pilot Station	552	189	2,949	1,187	1,764	1,568	1,302	832	1,957	1,663	583	1,464
Marshall	588	241	3,040	2,261	2,890	2,747	1,836	3,138	2,681	3,472	4,008	2,775
Y-2 Subtotal	5,989	1,297	14,662	12,435	11,770	9,511	10,341	11,394	11,544	13,483	13,454	11,255
Russian Mission	300	177	1,002	226	497	630	773	860	1,266	637	1,255	833
Holy Cross	161	89	1,441	2,094	2,396	1,029	2,090	1,373	1,024	1,148	1,598	1,333
Y-3 Subtotal	461	266	2,443	2,320	2,893	1,659	2,863	2,233	2,290	1,785	2,853	2,166
Lower Yukon Total	11,535	1,953	32,893	22,188	30,203	21,186	21,442	22,512	27,109	24,268	34,774	23,303
Anvik	309	118	2,203	2,750	2,167	4,088	902	720	2,125	913	394	1,750
Shageluk					150					370	434	123
Grayling	299	459	2,199	1,904	890	2,972	3,847	1,950	3,106	4,204	4,750	3,216
Kaltag	329	1,149	8,454	2,111	2,329	812	2,833	1,330	1,570	2,024	7,474	1,714
Nulato	807	477	5,280	1,134	621	217	3,159	1,675	4,240	1,762	2,200	2,211
Koyukuk	556	411	4,515	2,319	700	1,355	1,120	1,560	798	2,195	2,492	1,406
Galena	2,287	3,013	2,597	2,652	3,142	2,164	4,259	7,270	4,476	4,819	10,509	4,598
Ruby	2,145	3,033	8,367	4,557	7,984	6,662	12,319	8,505	6,717	7,101	11,000	8,261
Y-4 Subtotal	6,732	8,660	33,615	17,427	17,983	18,270	28,439	23,010	23,032	23,388	39,253	23,228

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Appendix A.3. Subsistence catch of fall chum salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987 (Continued).

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Tanana	10,282	12,682	32,842	32,834	30,820	31,470	41,630	42,690	28,113	32,049	41,825	35,190
Rampart	3,654	1,584	9,710	5,977	5,370	5,495	5,627	4,395	19,619	3,950	5,092	7,817
Fbks. F.C.	979	3,680	7,031	6,488	7,527	9,272	12,865	12,920	13,874	11,708	21,014	12,128
Stevens V	1,080	4,947	4,125	3,233	8,356	7,392	3,502	4,932	11,679	4,150	7,538	6,331
Beaver	22	1,591	1,792	190	735	1,878	6,004	0	1,761	3,321	5,750	2,593
Ft. Yukon	7,224	18,932	21,487	6,537	16,143	1,926	3,967	7,525	12,719	8,543	15,200	6,936
Circle	132	820	3,108	1,737	5,219	290	3,687	3,107	4,096	3,650	7,691	2,966
Eagle	6,542	4,863	26,754	16,740	30,997	13,255	20,021	18,519	25,264	16,027	19,678	18,617
Y-5 Subtotal	29,915	49,099	106,849	73,736	105,167	70,978	97,303	94,088	117,125	83,398	123,788	92,578
Manley	9,966	10,620	18,855	7,653	9,419	4,444	11,400	2,196	6,560	5,905	4,267	6,101
Minto				9,500	3,182	3,568	6,489	4,025	4,642	545	5,419	3,854
Nenana	20,102	19,255	29,430	29,742	10,176	9,034	11,685	13,520	22,901	15,902	26,909	14,608
Fairbanks	536	682	3,481	3,433	3,855	2,518	2,600	2,985	2,860	2,803	3,316	2,753
Y-6 Subtotal	30,604	30,557	51,766	50,328	26,632	19,564	32,174	22,726	36,963	25,155	39,911	27,316
Huslia	804	100	1,950	1,104	119	102	3,528	6,306	276	808	585	2,204
Hughes	775	175	1,201	2,265	611	1,231	327	1,280	1,260	1,422	586	1,104
Allakaket	146	1,717	1,130	2,879	1,410	716	1,915	556	707	878	1,477	954
Koyukuk R. Subtotal	1,725	1,992	4,281	6,248	2,140	2,049	5,770	8,142	2,243	3,108	2,648	4,262
Venetie	1,660	2,606	3,943	2,730	6,400	850	7,800	4,345		3,193	2,774	4,047
Chalkyitsik	600									1,533	2,686	1,533
Subtotal Chandalar/Black R.	2,260	2,606	3,943	2,730	6,400	850	7,800	4,345		4,726	5,460	4,430
Upper Yukon Total	71,236	92,914	200,454	150,469	158,322	111,711	171,486	152,311	179,363	139,775	211,060	150,929
Yukon Total	82,771	94,867	233,347	172,657	188,525	132,897	192,928	174,823	206,472	164,043	245,834	174,233

a Surveys were conducted prior to the end of the fall chum and coho fishing season in 1977 and 1978.
b Pitkas Pt. and St. Marys catches combined in 1978.

Appendix A.4. Subsistence catch of coho salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987.

Village	1977 a	1978 a	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Sheldons Pt.	200	35	495	389	215	1,770	170	245	49	237	308	494
Alakanuk	388	27	796	521	508	1,313	438	776	894	1518	1,116	988
Emmonak	1,057	142	1,368	789	1,295	4,795	1,290	3,659	1,552	732	3,497	2,406
Kotlik	807	938	525	109	1,751	3,314	1,692	1,415	751	238	1,475	1,482
Y-1 Subtotal	2,452	1,142	3,184	1,808	3,769	11,192	3,590	6,095	3,246	2,725	6,396	5,370
Mt. Village	1,877	2	117	1,739	1,055	3,025	2,500	982	1,527	828	2,481	1,772
Pitkas Pt.·	576		150	32	306	826	481	600	175	71	273	431
St. Marys b	495	292	298	982	877	1,957	1,048	1,424	938	4761	1,467	2,026
Pilot Station	930	1	347	1,510	431	2,644	638	1,114	710	1514	300	1,324
Marshall	458	303	220	538	1,067	1,777	1,405	2,946	1,484	1966	2,373	1,916
Y-2 Subtotal	4,336	598	1,132	4,801	3,736	10,229	6,072	7,066	4,834	9,140	6,894	7,468
Russian Mission	161	223	12	26	434	156	540	740	276	679	423	478
Holy Cross	202	0	0	65	56	519	377	0	100	102	259	220
Y-3 Subtotal	363	223	12	91	490	675	917	740	376	781	682	698
Lower Yukon Total	7,151	1,963	4,328	6,700	7,995	22,096	10,579	13,901	8,456	12,646	13,972	13,536
Anvik	144	20	33	625	385	58	250	40	272	296	405	183
Shageluk			62		20					173	72	58
Grayling	528	0	13	510	172	1,014	1,275	97	0	860	599	649
Kaltag	1,216	15	42	1,758	102	62	0	0	0	229	0	58
Nulato	1,814	0	2	271	140	76	0	0	510	69	85	131
Koyukuk	638	0	48	710	142	187	40	200	120	154	894	140
Galena	14	2	0	945	333	347	759	452	1,072	465	1,349	619
Ruby	0	108	59	1,376	746	867	1,122	1,631	1,719	339	0	1,136
Y-4 Subtotal	4,354	145	259	6,195	2,040	2,611	3,446	2,420	3,693	2,585	3,404	2,951

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Appendix A.4. Subsistence catch of coho salmon in numbers of fish by village in the Yukon River drainage, Alaska, 1977-1987 (Continued).

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	5 Yr Ave (1982-86)
Tanana	593	704	412	318	1,373	3,260	2,312	16,898	7,384	4,691	6,680	6,909
Rampart	75	52	0	15	169	0	47	120	513	110	81	158
Fbks. F.C.	20	0	39	36	6	20	78	254	13	709	64	215
Stevens V	22	12	0	181	95	23	0	145	182	67	0	83
Beaver	0	24	0	5	0	0	0	0	1	124	0	25
Ft. Yukon	16	177	30	0	70	125	11	33	3	118	41	58
Circle	70	0	0	0	0	0	0	0	0	37	0	7
Eagle	2	1	114	6	0	0	0	17	2	6	0	5
Y-5 Subtotal	798	970	595	561	1,713	3,428	2,448	17,467	8,098	5,862	6,866	7,461
Manley	2,610	1,273	1,419	1,454	3,723	837	1,350	1,566	1,926	538	1,467	1,243
Minto				180	267	1,500	0	800	1,144	1,058	671	900
Nenana	1,349	2,930	2,215	2,862	3,356	3,078	4,352	10,270	7,614	10,090	19,592	7,081
Fairbanks	71	506	978	667	1,915	2,003	1,230	2,149	1,077	1,635	2,465	1,619
Y-6 Subtotal	4,030	4,709	4,612	5,163	9,261	7,418	6,922	14,785	11,761	13,321	24,195	10,841
Huslia	0	0	0	633	146	17	475	12	0	31	124	107
Hughes	0	0	0	645	42	0	0	400	138	0	0	108
Allakaket	0	0	0	261	31	324	25	35	118	15	23	103
Koyukuk R. Subtotal	0	0	0	1,539	219	341	500	447	256	46	147	318
Venetie	0	0	0	0	0	0	0	0		0	17	0
Chalkyitsik										8	2	8
Subtotal Chandalar/Black R.	0	0	0	0	0	0	0	0		8	19	2
Upper Yukon Total	9,182	5,824	5,466	13,458	13,233	13,798	13,316	35,119	23,808	21,822	34,631	21,573
Yukon Total	16,333	7,787	9,794	20,158	21,228	35,894	23,895	49,020	32,264	34,468	48,603	35,108

a Surveys were conducted prior to the end of the fall chum and coho salmon fishing season in 1977 and 1978.
b Pitkas Pt. and St. Marys catches combined in 1978.